Isolation of phages from industrial environments to control biofilms

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Biofilms are frequently in many industrial environments and are responsible for severe negative impacts such as equipment damage, loss in product quality and in economics. For instance in pulp and paper industry, microorganisms together with their exudates and the entangled fibres and filler materials form massive and slimy protusions hanging out from the material surfaces, which interfere with the paper-making process in various steps. Also, in dairy industry, biofilm presence may be responsible for pathogen cross-contamination, product defects such as package bloating, decreased shelf life, and off flavours, odours and textures. The eradication of these biofilms, as reported by several authors, is very difficult due to the nature of biofilm structure and the physiological attributes of biofilm organisms which confer an inherent resistance to biocides. The application of biological agents such as phages as an alternative to the chemical products is an interesting approach that should be studied in more detail.

This work aimed the isolation of bacteria and the respective bacteriophages from a pulp and paper mill and from a dairy industry. The focus was given to EPS producing bacteria such as *P. fluorescens*, *Sphingomonas paucimobilis*, *Staphylococcus sciuri*, *and Klebsiella oxytoca*. Phages were isolated from the industrial effluents and also nearby waste water treatment plants. After phage isolation from each industrial sector, the selection was based on the wider broad of lytic activity and time of bacterial elimination. For each type of industry, a 5 phage cocktail is being developed to be tested in the control the most prevalent biofilm producing bacteria.

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